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ΠΤΔΕ ΦΛΩΡΙΝΑΣ

ΕΡΓΑΣΙΑ 1

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# 1. Ecology

Ecology (from Greek: οἶκος, "house", or "environment"; -λογία, "study of")[A] is the branch of biology[1] which studies the interactions among organisms and their environment. Objects of study include interactions of organisms with each other and with lifeless components of their environment. Topics of interest include the biodiversity, distribution, biomass, and populations of organisms, as well as cooperation and competition within and between species. Ecosystems are dynamically collaborating systems of organisms, the communities they make up, and the dead components of their environment. Ecosystem processes, such as main production, pedogenesis, nutrient cycling, and niche construction, regulate the flux of energy and matter through an environment. These processes are sustained by organisms with specific life history traits. Biodiversity means the varieties of species, genes, and ecosystems, enhances certain ecosystem services.

Ecology is not synonymous with environmentalism, natural history, or environmental science. It overlaps with the closely related sciences of evolutionary biology, genetics, and ethology. An important focus for ecologists is to improve the understanding of how biodiversity affects ecological function. Ecologists seek to explain:

Ecology has practical applications in conservation biology, wetland management, natural resource management (agroecology, agriculture, forestry, agroforestry, fisheries), city planning (urban ecology), community health, economics, basic and applied science, and human social interaction (human ecology). For example, the Circles of Sustainability approach treats ecology as more than the environment 'out there'. It is not treated as separate from humans. Organisms (including humans) and resources compose ecosystems which, in turn, maintain biophysical feedback mechanisms that moderate processes acting on living (biotic) and non-living (abiotic) components of the planet. Ecosystems sustain life-supporting functions and produce natural capital like biomass production (food, fuel, fiber, and medicine), the regulation of climate, global biogeochemical cycles, water filtration, soil formation, erosion control, flood protection, and many other natural features of scientific, historical, economic, or intrinsic value.

The word "ecology" ("Ökologie") was coined in 1866 by the German scientist Ernst Haeckel. Ecological thought is derivative of established currents in philosophy, particularly from ethics and politics.[2] Ancient Greek philosophers such as Hippocrates and Aristotle laid the foundations of ecology in their studies on natural history. Modern ecology became a much more rigorous science in the late 19th century. Evolutionary concepts relating to adaptation and natural selection became the cornerstones of modern ecological theory.

# 2. Ecological psychology

Ecological psychology is a term claimed by several schools of psychology with the main one involving the work of James J. Gibson and his associates, and another one the work of Roger G. Barker, Herb Wright and associates at the University of Kansas in Lawrence. Whereas Gibsonian psychology is always termed ecological psychology, the work of Barker (and his followers) is also sometimes referred to as environmental psychology. There is some overlap between the two schools, although the Gibsonian approach is more philosophical and deeply reflective on its predecessors in the history of psychology.

## 2.1 Barker

Barker's work was based on his empirical work at the Midwest Field Station. He wrote later: "The Midwest Psychological Field Station was established to facilitate the study of human behavior and its environment in situ by bringing to psychological science the kind of opportunity long available to biologists: easy access to phenomena of the science unaltered by the selection and preparation that occur in laboratories." (Barker, 1968). The study of environmental units (behavior settings) grew out of this research. In his classic work "Ecological Psychology" (1968) he argued that human behaviour was radically situated: in other words, you couldn't make predictions about human behaviour unless you know what situation or context or environment the human in question was in. For example, there are certain behaviours appropriate to being in church, attending a lecture, working in a factory etc., and the behaviour of people in these environments is more similar than the behaviour of an individual person in different environments. He has since developed these theories in a number of books and articles.

## 2.2 Gibson

James J. Gibson, too, stressed the importance of the environment, in particular, the (direct) perception of how the environment of an organism affords various actions to the organism. Thus, an appropriate analysis of the environment was crucial for an explanation of perceptually guided behaviour. He argued that animals and humans stand in a 'systems' or 'ecological' relation to the environment, such that to adequately explain some behaviour it was necessary to study the environment or niche in which the behaviour took place and, especially, the information that 'epistemically connects' the organism to the environment.

Gibson rejected outright indirect perception, in favour of ecological realism, his new form of direct perception that involves the new concept of ecological affordances. He also rejected the emerging constructivist, information processing and cognitivist views that assume and emphasize internal representation and the processing of meaningless, physical sensations ('inputs') in order to create meaningful, mental perceptions ('output'), all supported and implemented by a neurological basis (inside the head).

# 3. Ecological crisis

An ecological crisis occurs when changes to the environment of a species or population destabilizes its continued survival. A few possible causes include:

## 3.1 Abiotic factors

Climate change is starting to have major impacts on ecosystems. With global temperature rising, there is a decrease in snow-fall, and sea levels are rising. Ecosystems will change or evolve to cope with the increase in temperature. Consequently, many species are being driven out of their habitats.

While many species have been able to adapt to the new conditions by moving their range further towards the poles, other species are not as fortunate. The option to move is not available for polar bears and for some aquatic life.

## 3.2 Biodiversity extinction

Due to increase in ecological crisis,vast numbers of species are being annihilated. Every year between 17,000 and 100,000 species vanish from the planet. The speed in which species are becoming extinct is much faster than in the past. The last mass extinction was caused by a meteor collision 66 million years ago.

The loss of new species in an ecosystem will eventually affect all living creatures. In the U.S. and Canada, there was a dramatic reduction of shark population along the U.S. east coast. Since then, there has been an increase in population of rays and skates, which in turn has decimated the population of shellfish.[2] The loss of shellfish has reduced the water quality and the size of sea grass beds. Biodiversity is being lost at a fast rate. The more species there are in an ecosystem, the more resilient it is to evolution.

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| LESSON | TOPIC | ASSIGNMENT | Points | DUE |
| 1 | What is Distance Learning? | Wiki #1 | 10 | March 10 |
| Presentation | 20 |  |
| 2 | History & Theories | Brief Paper | 20 | March 24 |
| Spring Break | | | | |
| 3 | Distance Learners | Discussion #1 | 10 | April 7 |
| Group Project | 50 | April 14 |
| 4 | Media Selection | Blog #1 | 10 | April 21 |

# C:\Users\admin\Desktop\lifecycle_apple.gif4. Theoretical ecology

Theoretical ecology is the scientific discipline devoted to the study of ecological systems using theoretical methods such as simple conceptual models, mathematical models, computational simulations, and advanced data analysis. Effective models improve understanding of the natural world by revealing how the dynamics of species populations are often based on fundamental biological conditions and processes. Further, the field aims to unify a diverse range of empirical observations by assuming that common, mechanistic processes generate observable phenomena across species and ecological environments. Based on biologically realistic assumptions, theoretical ecologists are able to uncover novel, non-intuitive insights about natural processes. Theoretical results are often verified by empirical and observational studies, revealing the power of theoretical methods in both predicting and understanding the noisy, diverse biological world.

The field is broad and includes foundations in applied mathematics, computer science, biology, statistical physics, genetics, chemistry, evolution, and conservation biology. Theoretical ecology aims to explain a diverse range of phenomena in the life sciences, such as population growth and dynamics, fisheries, competition, evolutionary theory, epidemiology, animal behavior and group dynamics, food webs, ecosystems, spatial ecology, and the effects of climate change.

Theoretical ecology has further benefited from the advent of fast computing power, allowing the analysis and visualization of large-scale computational simulations of ecological phenomena. Importantly, these modern tools provide quantitative predictions about the effects of human induced environmental change on a diverse variety of ecological phenomena, such as: species invasions, climate change, the effect of fishing and hunting on food network stability, and the global carbon cycle.

# 5. Environmental science

Environmental science is an interdisciplinary academic field that integrates physical, biological and information sciences (including ecology, biology, physics, chemistry, plant science, zoology, mineralogy, oceanology, limnology, soil science, geology and physical geography (geodesy), and atmospheric science to the study of the environment, and the solution of environmental problems. Environmental science emerged from the fields of natural history and medicine during the Enlightenment.[1] Today it provides an integrated, quantitative, and interdisciplinary approach to the study of environmental systems.[2]

Related areas of study include environmental studies and environmental engineering. Environmental studies incorporates more of the social sciences for understanding human relationships, perceptions and policies towards the environment. Environmental engineering focuses on design and technology for improving environmental quality in every aspect.

Environmental scientists work on subjects like the understanding of earth processes, evaluating alternative energy systems, pollution control and mitigation, natural resource management, and the effects of global climate change. Environmental issues almost always include an interaction of physical, chemical, and biological processes. Environmental scientists bring a systems approach to the analysis of environmental problems. Key elements of an effective environmental scientist include the ability to relate space, and time relationships as well as quantitative analysis.

Environmental science came alive as a substantive, active field of scientific investigation in the 1960s and 1970s driven by (a) the need for a multi-disciplinary approach to analyze complex environmental problems, (b) the arrival of substantive environmental laws requiring specific environmental protocols of investigation and (c) the growing public awareness of a need for action in addressing environmental problems. Events that spurred this development included the publication of Rachel Carson's landmark environmental book Silent Spring[3] along with major environmental issues becoming very public, such as the 1969 Santa Barbara oil spill, and the Cuyahoga River of Cleveland, Ohio, "catching fire" (also in 1969), and helped increase the visibility of environmental issues and create this new field of study.

6. Η οικογένειά μου